

REMARKS

Of the seventeen claims originally submitted in this application, eight of them, Claims 10-17, have been withdrawn from consideration pursuant to a restriction requirement which, although unsaid, is deemed to have been made final.

The remaining nine claims, Claims 1-9, which are the subject of the examination summarized in the outstanding Official Action, stand rejected on substantive grounds. Applicants have amended the claims examined on the merits in this application and respectfully submit that the amended claims are patentable over the rejection of record.

All the claims examined on the merits in this application, Claims 1-9, stand rejected, under 35 U.S.C. §103(a), as being unpatentable over Derwent-Acc-No: 2002-178025 allegedly published on August 21, 2001, in view of U.S. Patent No. 6,290,859 to Fleming et al.

Applicants strongly contest the alleged teaching of the Derwent abstract disclosure. The Official Action speaks of the drawings and the claims of the underlying patent publication upon which the Derwent Abstract is based. However, the Korean patent, upon which the Derwent abstract is based, has not been applied in the rejection of record. Indeed, a copy of the underlying Korean patent and an English translation thereof have not been submitted to applicants. Thus, applicants strongly urge that the remarks made in regard to teaching of the underlying Korean patent have no weight in support of any substantive rejection under 35 U.S.C. §103(a).

Attention is directed to MPEP §706.02(II). That section of the Manual of Patent Examining Procedure states that when an abstract is used in support of a rejection, the

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evidence relied upon are the facts contained in the abstract, not any additional facts that may be containing in the underlying full text document.

Applicants emphasize that that MPEP §706.02(II) furthermore states that if the underlying document is to be used in support of a subsequent rejection the underlying document must be translated into English insofar as applicants presume that the underlying Korean patent publication is in the Korean language.

With this background, applicants submit that the Derwent abstract publication discloses a process for manufacturing a gate electrode of a semiconductor device which prevents tungsten from being corroded after the gate electrode is patterned and to eliminate remaining polymer and photoresist by using a revised sulfuric acid peroxide mixture (RSPM) in which the ratio of sulfuric acid to hydrogen peroxide is from 30:1 to 100:1. The teaching of the Derwent publication is that the application of the RSPM cleans the gate electrode, presumably without corroding the tungsten present therein.

Although it is not particularly pertinent, the only other disclosure in the applied Derwent abstract is that the RSPM is supplemented with fluoric acid-based solution.

Even if the disclosure in the Derwent abstract is directed to a complementary metal oxide semiconductor (CMOS) device, which is not stated in the Derwent abstract, still that disclosure does not make obvious any of the amended claims examined on the merits in the present application.

For one thing the ratio of sulfuric acid to hydrogen peroxide is not specific. That is, the claimed process of the present application requires that the ratio of sulfuric acid to hydrogen peroxide be a volume ratio. There is no disclosure in the Derwent abstract defining whether the ratio of sulfuric acid to hydrogen peroxide is a weight, volume or molar ratio.

In any event this issue has been made moot by applicants' amendment of their broadest claim, Claim 1. Claim 1 has been amended to limit the volume ratio of sulfuric acid to hydrogen peroxide to a range of between about 6:1 and about 10:1. Clearly, this amendment distinguishes the claimed process of the present application from the process disclosed in the Derwent abstract. The Derwent abstract disclosure limits the sulfuric acid to hydrogen peroxide ratio to 30:1 – 100:1. Thus, the minimum ratio, even if it were a volume ratio, which as stated above is not stated, is 30:1, far in excess of the maximum claimed volume ratio of about 10:1.

It is emphasized that applicants' amendment to the claims is fully supported by the originally filed application. Indeed, the limitation added to Claim 1 originally appeared in Claim 3. It is noted, in this regard, that original Claims 2 and 3 are made moot by the amendment to Claim 1 and have been canceled.

That the volume ratio of sulfuric acid to hydrogen peroxide is critical is made apparent by the disclosure of the present application. As indicated therein, the higher the concentration of the hydrogen peroxide oxidizer the greater the rate at which tungsten is etched. Thus, a ratio of at least 30:1, the minimum ratio taught in the Derwent abstract, of sulfuric acid to hydrogen peroxide is not surprisingly not terribly detrimental to preventing corrosion of the tungsten. However, that a much higher concentration of hydrogen peroxide, e.g. at least 10:1, can be utilized without tungsten etching is indeed surprising. In view of the fact that higher concentrations of hydrogen peroxide can be utilized in the process of the present application, without comprising the retention of tungsten, emphasizes the patentability of the claimed process. That is, the higher the concentration of the hydrogen peroxide in the sulfuric acid-hydrogen peroxide volume ratio, the more effective is the residual removal after plasma

processing. Thus, the utilization of a volume ratio of no greater than about 10:1 without tungsten etching predicates patentability over the process set forth in the principal Derwent abstract reference.

The above remarks makes crucial the disclosure of the secondary reference, U.S. Patent No. 6,290,859 to Fleming et al. The Fleming et al. reference is applied for its disclosure of processing conditions consistent with those claimed in the present application. Indeed, the portion of Fleming et al. applied in the rejection of record is the disclosure of utilizing a mixture of sulfuric acid to hydrogen peroxide in a concentration range of between 5:1 and 10:1, albeit again, the question of what type of ratio is intended is not set forth. However, in view of the language used in Fleming et al., there is a strong suggestion that the ratio referred to is by weight, rather than by volume.

Even if the ratio referred to in Fleming et al. were by volume still this disclosure cannot be employed to supplement the deficiency discussed above in Derwent to make unpatentable, under 35 U.S.C. §103(a), any of the amended claims currently in the present application. This is so insofar as the mixture of sulfuric acid to hydrogen peroxide that is referred to in the outstanding Official Action is not utilized in the removal of photoresist residue after the introduction of tungsten onto a semiconductor device. Rather, the microelectromechanical (MEM) device produced in Fleming et al. employs a semiconductor surface comprising polysilicon upon which tungsten is subsequently disposed, after cleaning with the aforementioned sulfuric acid-hydrogen peroxide solution.

Attention is directed to Fleming et al. at Column 10, lines 24 et seq. where this disclosure is specifically set forth. It is again emphasized that the present invention is directed to a process of cleaning photoresist from a CMOS device which includes tungsten

without etching the tungsten. The teaching of Fleming et al. is directed to the preparation of a MEM surface so that tungsten can be subsequently disposed thereon. As such, the disclosure in Fleming et al. bears no relationship to the invention claimed in this application.

Reconsideration and removal of the substantive rejection of record, in view of the amendment to the claims and the above remarks, is deemed appropriate. Such action is respectfully urged.

Applicants submit that the above amendment and remarks establish the patentable nature of all the claims currently examined on the merits in this application. Notice of Allowance and passage to issue of these claims, Claims 1 and 4-9, is therefore respectfully solicited.

Respectfully submitted,



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